

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

TITLE

WALL-WASH LIGHT FIXTURE

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CERTIFICATE OF MAILING 37 C.F.R. § 1.10

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WALL-WASH LIGHT FIXTURE

Reference to Related Application

[0001] This application claims priority from U.S. Provisional Patent Application
5 Serial Number 60/422,334 filed October 30, 2002.

Field of the Invention

[0002] The present invention pertains to light fixtures; more particularly, the present
invention pertains to light fixtures typically used for illuminating substantially vertical
10 surfaces such as a wall.

Background

[0003] Interior designers often use lighting to create visual effects within a room.
One of the more popular dramatic effects includes illuminating a vertical surface such as a
15 wall with light. The light fixtures designed to illuminate a wall are typically called
wall-wash fixtures. If a wall-wash light fixture is mounted in a ceiling, it falls into a class of
lighting fixtures known as down lights. If a wall-wash light fixture is positioned near the
floor, it is called an up-light.

[0004] Ceiling mounted down light fixtures, particularly those whose bottom surface is substantially flush with a ceiling surface, typically include a housing which extends upwardly through a hole in a ceiling panel. The housing provides a mounting for the light source, electrical connections for the light source, and a mounting for the visible portion of the trim ring assembly. Ceiling mounted down light fixtures are used to provide illumination in many residential, commercial, and educational buildings.

[0005] Most ceiling mounted down light fixtures are used for direct room illumination; however, some ceiling mounted down light fixtures are used to create a wall-wash lighting effect. Such wall-wash lighting effect from ceiling mounted down lights is often created by directing the light rays from the light source at an angle with respect to a plane perpendicular to the ceiling. However, to properly direct the light toward the wall to be illuminated, it is often necessary to either enlarge the opening in the trim ring through which light passes or to move the light source to a position below the ceiling surface. Neither of these two solutions is generally acceptable to interior designers.

[0006] When floor mounted up-light fixtures are used to create wall-wash light, they are often tilted toward the walls to direct the light rays emitted by the light source. However, the result from tilting an up-light fixture toward a wall is strong illumination near the lighting fixture and the appearance of a parabolic-shaped lighting pattern.

[0007] Because of the continued desire of interior designers to obtain unique and dramatic lighting effects with wall-wash lighting fixtures, a variety of different wall-wash light products are now available. While presently available ceiling or floor mounted wall-

wash light fixtures are able to illuminate wall surfaces, problems still remain. First, most of the commonly available wall-wash light products provide an illumination pattern which produces substantially different light intensities on substantially vertical wall surfaces. Second, most of the commonly available wall-wash light fixture products do not fully and uniformly direct light toward the surface to be illuminated. Specifically, the pattern of light on the wall to be illuminated includes noticeable dark areas either near the top or near the bottom of the wall. These dark areas extend into the corners where the wall joins either the ceiling or the floor. Third, wall-wash light fixture products with a large opening in the trim ring or with the light source extending outwardly from the wall-wash lighting product create an appearance unacceptable to most interior designers.

[0008] Accordingly, there remains a need in the art for a wall-wash light fixture which provides a substantially uniform wall illumination pattern, illuminates a large portion of the wall, and minimizes the size of the dark areas where the wall intersects the ceiling or the floor, while at the same time presenting an unobtrusive appearance acceptable to room designers.

SUMMARY

[0009] The disclosed wall-wash light fixture provides a substantially uniform wall illumination pattern, illumines a large portion of the wall, and minimizes the size of dark areas, while at the same time presenting an unobtrusive appearance acceptable to room designers.

[0010] Occupants of a room including the ceiling mounted down light embodiment of the wall-wash light fixture of the present invention will observe a trim ring assembly including an external portion positioned against or mounted flush with a ceiling surface, with a relatively small unobtrusive hole in the visible portion of the trim ring assembly.

5 [0011] Extending upwardly from the trim ring assembly in the ceiling mounted down light embodiment, through a hole in the ceiling, is a housing portion. The housing portion provides a mounting for the trim ring assembly and encloses a light source positioning ring for determining the angular position of the light source with respect to a plane perpendicular to the plane of the ceiling. The light source positioning ring includes an upper surface which
10 is angled away from the wall surface to be illuminated. This upper angled surface of the light source positioning ring causes the light from the light source to be directed away from the wall to be illuminated and toward a curved planar reflecting surface within a substantially arcuate kick reflector. The substantially arcuate kick reflector is positioned by and contained within the light source positioning ring.

15 [0012] The combination of the angled mounting of the light source on the light source positioning ring with the position and substantially arcuate shape and curved planar reflecting surface of the kick reflector first directs the light from the light source away from the wall surface to be illuminated and then captures and reflects the light rays through the opening in the visible portion of the trim ring assembly toward the wall. The curved planar
20 reflecting surface on the inside of the kick reflector, together with its substantially arcuate shape, disperses the light rays to produce a substantially uniform illumination pattern on the wall surface. Unlike other wall-wash light fixture products, the wall-wash down light of the

present invention not only provides a substantially uniform pattern of illumination on the wall, but also illuminates a larger area, thus minimizing the size of the dark areas often found near the top or the bottom of an illuminated wall.

[0013] Occupants of a room including the floor mounted embodiment of the wall-wash up-light fixture of the present invention may or may not see the light fixture itself. However, the construction of the up-light fixture is substantially the same as the down light fixture in that the light source is mounted at an acute angle with respect to a plane perpendicular to the plane of the floor and a substantially uniform pattern of illumination is provided by the use of the substantially arcuate kick reflector.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0014] A better understanding of the wall-wash light fixture of the present invention may be had by an understanding of the drawing figures, wherein:

Figure 1 is a front elevational view in partial section of a room showing the mounting of the disclosed wall wash down light fixture in the ceiling;

Figure 2A is a side elevational view of the disclosed down light fixture shown with the lower portion of a trim ring assembly mounted flush with a ceiling surface;

Figure 2B is a view similar to Figure 2A with the lower portion of a trim ring assembly positioned against a ceiling surface;

Figure 3 is an exploded perspective view;

Figure 4A is a perspective view of the substantially arcuate kick reflector; and

Figure 4B is a side elevational view, in partial section, of the substantially arcuate kick reflector.

5 **DESCRIPTION OF THE EMBODIMENTS**

[0015] As may be seen in Figure 1, the ceiling mounted down light embodiment of the disclosed wall-wash light fixture of the present invention **10** is designed for use in a room wherein the light from a ceiling **112** mounted down light is used to illuminate an adjoining wall **110** surface. In some prior art down light fixture products, the light source within the housing portion of the down light is simply tilted towards the wall surface to be illuminated. While some light from these prior art down light fixture products does illuminate the wall, a portion of the light emitted by prior art down light fixture products is directed toward and reflected by the inside of the housing. The result is non-uniform illumination of the wall surface and the presence of dark areas near the intersection of the wall and ceiling. While some have tried to remedy these problems by enlarging the size of the hole in the visible portion of the trim ring assembly, most interior designers find this to be an unacceptable solution.

[0016] In the up light embodiment of the present invention **10**, the light fixture itself may be set on the floor or permanently mounted in a hole formed in the floor.

[0017] In some interior design applications, a wall-wash lighting fixture is used when there is a picture **114** or a sculpture **116** to be illuminated, as shown in Figure 1. While the following description is centered around a ceiling mounted down light wall-wash fixture, those of ordinary skill in the art will understand that the description of the operation and general construction of the disclosed wall-wash light fixture also applies to floor mounted up-light fixtures.

[0018] A general understanding of the operation of the wall wash down light of the present invention may be had by reference to Figures 2A and 2B. Therein, it may be seen that the wall wash down light assembly of the present invention **10** is designed for mounting through a hole in a ceiling **112**. Occupants of the room looking up toward the ceiling will generally notice only the lower or visible portion of the trim ring assembly **20** which is adjacent the ceiling surface and only a small portion which extends in to the bottom part of the housing assembly **30**. Those of ordinary skill in the art will understand that multiple types of trim ring assemblies are available and may be used with the present invention. For example, a comparison of Figure 2A with Figure 2B will reveal that Figure 2A shows a trim ring assembly **20** having a lower portion that lays flush with the lower surface of the ceiling **112**, while Figure 2B shows a trim ring assembly **20** including a lower portion constructed to lay against the lower surface of the ceiling **112**. It is the preference of most interior designers to minimize the size of the hole in the visible portion of the trim ring assembly **20** through which light passes and to assure that nothing extends into the room under the trim ring assembly **20**.

[0019] As shown in Figures 2A and 2B, a key portion of the wall wash down light assembly 10 is a housing assembly 30 which extends upwardly through a hole in the ceiling 112. Within the housing assembly 30 is the light source positioning ring 32 whose utility is described below with reference to Figure 3. As may be seen in Figures 2A and 3, the light source 100 is tilted away from the wall 110. This tilting of the light source 100 away from the wall 110 enables the light produced by the light source 100 to fall upon the interior curved planar reflecting surface 54 within a substantially arcuate kick reflector 50. The interior curved planar reflecting surface 54 of the substantially arcuate kick reflector 50 both diffuses the light and reflects it back toward the wall 110. It is the combination of the angular mounting of the light source 100, the substantially arcuate shape of the kick reflector 50, and the interior curved planar reflective surface 54 of the kick reflector 50 which disperses the light emanating from the light source 100 so that the wall 110 to be illuminated is illuminated in a substantially uniform manner, and minimizes the presence of dark areas near the intersection of the wall with the ceiling, while at the same time maintaining a relatively small opening in the visible portion of the trim ring assembly 20, through which the light passes.

[0020] A still better understanding of the wall wash down light fixture 10 of the present invention may be had by the exploded view which appears in Figure 3. As previously indicated, a trim ring assembly 20 appears at the bottom of the fixture 10. The trim ring assembly 20 may be affixed to the housing assembly 30 by a variety of different means 24 such as clips, ball detents, etc., all of which are well known to those of ordinary skill in the art.

[0021] Positioned within the housing assembly 30 is a light source positioning ring 32. The light source positioning ring 32 has an angled top surface 34. It is this angled top surface 34 which causes the light source 100 to be positioned at an acute angle A with respect to a plane perpendicular to the plane of the ceiling as shown in Figure 2B. In the preferred embodiment, angle A is about 3°; however, it has been found that angles from about 1° to about 5° also provide suitable lighting effects. Those of ordinary skill in the art will understand that the light source positioning ring 32 may be adjustably mounted to allow fine tuning of the emitted light beam to match special lighting situations or room geometrics. Alternatively, the angled top surface 34 of the light source positioning ring 32 may allow positioning the light source 100 within a pre-determined range of acute angles with respect to a plane perpendicular to the plane of the ceiling.

[0022] A close examination of Figure 3 will reveal that the angled top surface 34 of the light source positioning ring 32 also provides a mounting surface for the substantially arcuate kick reflector 50 and an optional diffusing lens 55. An optional diffusing lens 55 may be included such as a frosted lens, a solex lens, a devon-type spread lens, or any other type lens which provides a specialty lighting effect.

[0023] By a comparison of Figure 2A, Figure 2B, and Figure 3, it may be seen that mounting arms 36 are positioned on either side of the light source positioning ring 32. The mounting arms 36 extend upwardly to a cross-piece 66. Further fine tuning of the position of the light source 100 may be accomplished by allowing for a small adjustment of the position of the cross-piece 66 with respect to the mounting arms 36.

[0024] The cross-piece 66 provides a mounting for a connector 62 which mates with wires 64 on one side and engages the contacts 102 to provide electrical power to the light source 100. Those of ordinary skill in the art will recognize that Figure 3 illustrates an MR-16 style light source 100; however, the present invention may be used with a variety of different types of light sources and is not limited to just one style of light source.

[0025] The substantially arcuate kick reflector 50 is further depicted in Figures 4A and 4B. Specifically, the substantially arcuate kick reflector 50 includes a mounting ring 56 which rests on the light source positioning ring 32 when the disclosed wall-wash down light fixture 10 is assembled.

[0026] The arcuate snout portion 52 of the kick reflector 50 is affixed to the mounting ring 56. The curved planar inside surface of the arcuate snout portion 56 forms the interior reflecting surface 54. As previously indicated, it is the curved planar interior reflecting surface 54 which directs the light from the light source 100 toward the wall to be illuminated. If desired, the interior reflecting surface 54 of the kick reflector 50 may be machined, roughened, or formed with a variety of different surfaces to further diffuse any light reflected therefrom. As may be seen in Figure 4B, the interior reflecting surface 54 is formed at an acute angle B to a plane perpendicular to the plane of the mounting ring 56. In the preferred embodiment, angle B is about 2°. Accordingly, the total deflection angle of the light emitted by the light source is the sum of angle A and angle B or about 5° in the preferred embodiment. Other total deflection angles of from about 3° to about 7° have also provided satisfactory results.

[0027] Those of ordinary skill in the art will understand that by placing small shims between the mounting ring **56** of the substantially arcuate kick reflector **50** and the light source mounting ring **32**, small adjustments may be made to the size of angle B to fine tune the light pattern falling on the illuminated wall surface. Such small adjustments to the illumination pattern on the wall may also be made by adjusting the relative angle between connector **62**, the cross-piece **66**, and the light source **100** with respect to the mounting arms **36**.

[0028] Still further adjustments may be made by changing the arcuate size or the partial substantially circular perimeter of the arcuate snout portion **52**. While the preferred embodiment of the kick reflector **50** is shown to be substantially circular, other configurations such as a substantially elliptical shape or a substantially oval shape may be used to solve unique lighting problems. The shape of the kick reflector **50** must be such that the light emitted from the light source **100** encounters a smooth curved planar reflecting surface **54** within the kick reflector **50**.

[0029] Accordingly, the wall wash light fixture of the present invention uses the combination of the angled mounting of the light source **100**, the capture of the light emanated from the light source **100** by the shape of the substantially arcuate kick reflector **50**, and the curved planar reflecting surface **54** and substantially arcuate shape of the kick reflector **50** to diffuse the light in a substantially uniform manner to provide a substantially uniform illumination of the wall in close proximity to either a ceiling or a floor in which the wall-wash light fixture of the present invention is mounted.

[0030] As will be understood by those of ordinary skill in the art and as shown in Figure 1, a plurality of wall-wash light fixtures may be used when it is necessary to illuminate a wall having a large surface.

[0031] While the present system and method has been disclosed according to the preferred embodiment of the invention, those of ordinary skill in the art will understand that
5 other embodiments have also been enabled. Such other embodiments shall fall within the scope and meaning of the appended claims.